

**NASA AMES Research Center  
Moffett Federal Airfield, CA  
Area of Investigation 8**

*Department of Toxic Substances Control  
Berkeley, California*

*Berkeley Office  
February 1999*

**I. INTRODUCTION**

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has entered into a Voluntary Cleanup Agreement with NASA Ames Research Center (NASA Ames) to conduct investigations on releases of hazardous substances to the environment and to develop remedies for addressing these releases.

DTSC has prepared this fact sheet to provide information and seek public comments on the proposed cleanup activities for the NASA Ames, Area of Investigation 8 (AOI 8) located at Moffett Field, CA.

This fact sheet is the third in a series providing information about the NASA Ames Site (Site). Specifically it describes the draft Removal Action Workplan (RAW) for AOI 8.

In addition, DTSC has prepared a proposed Negative Declaration in accordance with the California Environmental Quality Act (CEQA). The proposed Negative Declaration finds that implementing the draft RAW will have no adverse impacts.

DTSC invites comments on both the draft RAW and the proposed Negative Declaration during a 30-day comment period February 1 to March 4, 1999. These documents are available at locations listed on the front cover (see Information Repositories).

**PUBLIC COMMENT PERIOD**

*February 1, 1999 – March 4, 1999*

**Send comments to DTSC with a postmark date of no later than March 4, 1999. Send written comments to Derek Whitworth, Project Officer, at 700 Heinz Ave. Room 200, Berkeley, CA 94710.**

This fact sheet provides background on soil and groundwater contamination at the Site and describes interim cleanup measures. It also provides information on:

- the cleanup alternatives considered, and
- opportunities for public participation.

**II. SITE HISTORY AND BACKGROUND**

NASA Ames is a federal facility located at Moffett Field, California. The facility is comprised of 440 acres of the approximately 1,800-acre site. Moffett Federal Airfield (formerly Naval Air Station Moffett Field) and Onizuka Air Station occupy the remainder of Moffett Field. (see map 1)

There are 102 buildings at NASA Ames, primarily located in the southern portion of the center. One focus of the work at NASA Ames is information technology. The buildings consist of major technical facilities and laboratories used for information systems and technology, and aeronautical, physical, space, earth system, and life sciences research. There are also general administrative support buildings and structures.

The northern part of NASA Ames is mainly undeveloped, consisting of non-tidal marshlands and grasslands. Some of this part of the property has been defined as wetlands.

According to the NASA Ames Master Plan, no future development is planned for the wetland areas of NASA Ames.

Operations at NASA Ames have used various hazardous substances. Previous investigations and reports indicated that some of these substances have been released into the soil and/or groundwater in AOI 8. These substances have been designated as Chemicals of Concern (COC) for AOI 8.

Records of spills and releases occurring since 1988 are well documented. Releases or potential releases occurring before 1988 were identified through the review of documents, including historical aerial photographs as well as interviews with long-time and previous employees.

Due to the size, the number of buildings, and the variety of activities that have occurred at NASA Ames, twelve Areas of Investigation (AOIs) were identified at the facility to allow for a more focused investigation of each selected area. Five of these AOIs are under the oversight of DTSC. This fact sheet focuses on AOI 8.

### III. AOI 8 BACKGROUND

AOI 8 is located in the northwest corner of the Site (see map 2) in an area formerly known as Navarro Farms. James A. Navarro, Inc. leased this area from 1982 to 1989 to grow and pack produce. A structure was used as a warehouse and for packaging. The surrounding land was used for equipment storage. In 1989, NASA Ames closed the operation pursuant to Santa Clara County closure requirements and under their oversight. The Fire Department intentionally burned down the buildings used by Navarro Farms during a fire suppression exercise in July 1989.

A soil bioremediation pad is located in the northwest corner of AOI 8 and has been in operation since the early 1990s to remediate soil excavated from construction and cleanup projects in other areas at NASA Ames. The remainder of AOI 8 is covered with soil and recycled concrete materials and is generally flat.

Currently, AOI 8 is mainly used for storage and recycling of excess materials and equipment.

Building N267, constructed in May 1992, is used to support maintenance and disaster preparedness operations for the facility.

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The area immediately surrounding building N267 consists mostly of paved areas for roads and parking lots.

During a 1995 Center-wide Sampling and Analysis Program conducted by NASA Ames, a review of documents indicated potential areas of contamination at AOI 8. A subsequent site investigation conducted at AOI 8 indicated that the contamination originated from a fuel spill at the former above ground tank (AST), historical application of pesticides onto land used for agricultural purposes and drum storage at various locations. Thus, AOI 8 includes the former above ground tank (AST), the pesticide excavation area, and the former drum storage areas.

### Chemicals of Concern (COC)

COC for AOI 8 include petroleum hydrocarbons, especially diesel and oil and grease. Soils in AOI 8 were analyzed for the COC. Concentrations of Total Petroleum Hydrocarbons (TPH) and Total Oil and Grease (TOG) have been detected at a variety of locations across AOI 8, ranging from below remediation levels to 16,000 milligrams per kilogram (mg/kg). Table 1 lists AOI 8 remediation levels.

AOI 8 groundwater was analyzed for the COC. Concentrations of petroleum hydrocarbons detected in the groundwater ranged from below remediation levels to 1,200 micrograms per liter ( $\mu\text{g}/\text{l}$ ). Table 1 lists AOI 8 remediation levels.

### Former Above Ground Tank

A former above ground diesel fuel storage tank was located on the front, right side of the former building and west of soil boring B-6 (Map 2). In 1987, a 100-gallon fuel spill was reported near this tank. Contaminated soil was excavated and remediated as part of the 1989 Navarro Farms Closure.

### Pesticide Excavation

Ames conducted a soil investigation as part of the Navarro Farms Closure (see map 2) in September

1989. Samples collected during this investigation contained 2-4-Dichlorophenoxyacetic acid up to 370 mg/kg. 2-4-Dichlorophenoxyacetic acid, commonly referred to as 2-4-D, is a selective herbicide used for crop weed control.

Based on the analytical results, approximately 20 cubic yards of pesticide contaminated soil was excavated and managed as hazardous waste at a Treatment Storage & Disposal Facility.

### **Former Tank U13**

In 1989, a 1,500-gallon underground, fuel storage tank (U13) of unknown origin was identified during an inspection relating to the closure of Navarro Farms (see map 2). Once identified the tank was properly closed with oversight from Santa Clara County. The tank was managed as a hazardous waste.

Two soil samples were collected from the excavation and analyzed for total petroleum hydrocarbons as diesel (TPH-D) and total petroleum hydrocarbons as gasoline (TPH-G). Petroleum hydrocarbons were not detected at this location. Both diesel and gasoline are refined products from crude oil. Gasoline is derived from the light/heavy naphta components whereas diesel is derived from the light gas oil component of crude oil.

### **Drum Storage**

Drums containing waste oil were stored at various locations. These drums were primarily stored on the eastern side of the AOI 8. Some oil was released into the soil.

### **Bioremediation Pad**

A soil bioremediation pad is located in the northwest corner of AOI 8 and has been used for more than five years to remediate soil excavated from construction and cleanup projects at NASA Ames. Soil is stockpiled and treated on the bioremediation pad.

Only soil with total petroleum hydrocarbons less than 1,000 mg/kg is treated on this pad. Soil above 1,000 mg/kg is managed as hazardous waste at an off-site Treatment Storage and Disposal Facility.

## **IV. ENVIRONMENTAL SETTING**

The groundwater flow direction beneath NASA Ames is generally north toward the San Francisco Bay.

The uppermost aquifer present in AOI 8 occurs from approximately 2 to 25 feet below ground surface. This first water-bearing unit is locally referred to as the A/A1 aquifer.

## **V. NATURE AND EXTENT OF CONTAMINATION**

Soil and groundwater have been extensively sampled within AOI 8. Three locations have been moderately affected by high boiling point hydrocarbons. Soils containing petroleum hydrocarbons at elevated concentrations have been identified at the soil borings B-6 and B-18 and test pit TP-21, located near the south and east sides of AOI 8 (see map 2).

Petroleum hydrocarbons, diesel, and oil and grease have been detected in the soil at scattered locations across AOI 8. Diesel was detected above the remediation level (B-6). Oil and grease was detected at elevated levels at three locations (B-6, B-18, and TP-21). A remediation level has not yet been established for oil and grease.

Low levels of pesticides and chlorinated hydrocarbons have also been detected in the soil in AOI 8, but at concentrations below the remediation levels. Table 1 lists AOI 8 remediation levels.

Dissolved petroleum hydrocarbons have been found in the groundwater in AOI 8. Additionally, COC have been present sporadically at concentrations above remediation levels in one well. However, since March 1996 there have been no exceedances of COC above remediation levels.

## **VI. Clean-Up Alternatives**

A draft Removal Action Workplan (RAW) was prepared to evaluate several cleanup alternatives and to recommend a preferred cleanup approach.

The removal action objectives for the site are to minimize the risk to public health and the environment.

Contaminants at concentrations above the selected remediation levels are considered to pose a risk (see Table 1). The goal of the removal action is to reduce the concentration of the contaminants to below the remediation level shown in Table 1.

**Table 1**

Media	Compound	Remediation Level
Soil (mg/kg)	TPH-diesel	400
	TPH-motor oil	NE
	TRPH	NE
	TOG	NE
	2,4-D	650
Groundwater (µg/l)	TPH-diesel	700
	TPH-5	700
	TPH-8	700
	TRPH	NE

- TPH = Total Petroleum Hydrocarbons
- TPH-5 = TPH as Jet Propulsion Fuel No. 5
- TPH-8 = TPH as Jet Propulsion Fuel No. 8
- TRPH = Total Recoverable Petroleum Hydrocarbons
- TOG = Total Oil & Grease
- 2,4-D = 2,4-Dichlorophenoxyacetic acid
- µg/l = micrograms per liter
- mg/kg = milligrams per kilogram

Three alternatives have been assessed for cleanup of this Site.

Alternatives 2 and 3 include physical removal of contaminants (i.e., soil excavation) and long-term groundwater monitoring. Specifically, these alternatives are:

**Alternative 1 - NO ACTION**

This alternative is a baseline against which to evaluate other alternatives. No active means would be taken to stop the further migration of the contaminants. The effects of natural degradation processes would result in eventual soil remediation.

**Alternative 2 – SOIL EXCAVATION AND UPGRADE OF BIOREMEDIATION PAD**

- Excavate soil at locations of soil borings B-6 and B-18 and test pit TP-21.
- Upgrade existing bioremediation pad.

- Monitor groundwater downgradient from the bioremediation pad, soil borings B-6 and B-18, and test pit TP-21.
- Natural degradation

The removal action for the contaminated soil is expected to remove the source of the petroleum hydrocarbon contamination in the groundwater.

During and after removal of the contaminant sources there will be natural degradation of residual contaminants.

Migration of petroleum hydrocarbons from the soil into groundwater is the probable source of groundwater contamination. In Alternative 2 the source of the contamination will be removed. Therefore it does not appear that a removal action plan for the groundwater is required at this time since the source will be removed and there has not been a consistent exceedence of remediation levels.

A 6-inch high concrete berm shaped like a speed bump will be constructed surrounding the existing bioremediation pad to minimize rainwater runoff.

Groundwater will be monitored, data analyzed, and reported on a routine basis. Groundwater plumes will be mapped. Additional removal actions and installation of more wells will be implemented, as necessary. Groundwater monitoring will continue for one year after remediation levels have been achieved. Upon completion of the first biennial monitoring, a projection of when the remediation goals will be met will be prepared.

**Alternative 3 – IN-SITU BIOREMEDIATION WITH AIR SPARGING AND UPGRADE OF THE BIOREMEDIATION PAD**

- Install in-situ bioremediation system using air-sparging technology at locations of soil borings B-6 and B-18 and test pit TP-21.
- Soil confirmation sampling near soil borings B-6 and B-18 and test pit TP-21 after 6 to 12 months of system operation.
- Upgrade existing bioremediation pad.
  - Monitor groundwater downgradient from the bioremediation pad, soil borings B-6 and B-18 and test pit TP-21.

**VII. RECOMMENDED ALTERNATIVE**

Alternative 2 will protect public health and the environment, can readily be implemented and is cost effective.

Alternative 2 involves source removals at several locations including B-6, B-18, and T-21. The existing bioremediation pad will also be upgraded. This would be an effective and permanent removal action.

These alternatives were evaluated for effectiveness, implementability and cost. Alternative 2 (Soil

Excavation and Upgrade of Bioremediation Pad) is the recommended alternative for AOI 8.

Upgrading the existing bioremediation pad would prevent the recontamination of areas near this pad. Confirmation samples will be taken and additional soil will be excavated until all contamination is removed. Clean soil will be used for backfill.

Existing groundwater monitoring wells will be used to monitor the groundwater. Monitoring will continue one year after remediation goals are met.

## INFORMATION REPOSITORIES

NASA's Centerwide Sampling and Analysis Plan, EKI, March 1994; Draft Removal Action Workplan for Area of Investigation 8 NASA Ames Research Center, Uribe & Associates, 1998; and all reports related to environmental investigations at NASA Ames are available for your review at the Sunnyvale and Mountain View Public Libraries. The full administrative record is available at DTSC's Berkeley office.

<b>Sunnyvale Public Library</b>	<b>Day</b>	<b>Hours</b>	<b>City of Mountain View Public Library</b>	<b>Day</b>	<b>Hours</b>
665 W. Olive Avenue Sunnyvale, CA (408) 730-7300	Mon.-Thurs. Fri.-Sat. Sunday	10 a.m. - 9 p.m. 10 a.m. - 6 p.m. Noon - 8 p.m.	585 Franklin Street Mountain View, CA (650) 903-6887	Mon.-Thurs. Fri.-Sat. Sunday	10 a.m. - 9 p.m. 10 a.m. - 6 p.m. Noon - 5 p.m.

## PUBLIC PARTICIPATION

DTSC encourages the exchange of information with interested members of the community. Your interest and involvement will help ensure a thorough review of the information gathered and the alternatives considered. If you have any questions on the NASA Ames Areas of Investigation program, please contact any of the following.

### DEPT. OF TOXIC SUBSTANCES CONTROL

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### LOCAL SITE REPRESENTATIVE

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TO:

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